

Claims

1. A ~~truck~~ comprising:  
an oxides-of-nitrogen ("NOx", hereinafter) trap assembly  
having an adsorption material which is regenerated with a mixture  
including hydrogen and carbon monoxide ("syngas", hereinafter);  
5 a fuel cell power plant receiving air at an air inlet, receiving a  
hydrogen rich fuel mixture at a fuel inlet, and having humidified air  
exhausting from an air exit, said fuel cell power plant providing  
electrical power to operate auxiliary apparatus in said ~~truck~~,  
an internal combustion engine system which operates on  
10 engine fuel and provides engine exhaust having NOx therein to said  
NOx trap assembly;  
means for generating syngas from said engine exhaust, said  
engine fuel and humidified air exhausting from said fuel cell power  
plant, in an amount in excess of that required to regenerate  
15 adsorption material in said NOx trap assembly; and  
a palladium membrane separator receiving at its input syngas,  
and providing at a main output thereof syngas for use in regenerating  
said adsorption material, and providing to said fuel inlet of said fuel  
cell stack from an additional output of said separator, a hydrogen rich  
20 gas mixture.

2. A ~~truck~~ according to claim 1 wherein:

said palladium membrane separator has membranes that may  
leak some syngas including CO from said additional output; and  
further comprising:  
5 a methanator, the hydrogen rich gas mixture from said  
additional output of said palladium membrane separator being applied  
to said methanator, wherein the CO is converted to CH<sub>4</sub>, the output

of said methanator being applied to the fuel inlet of said fuel cell stack.

3. A ~~truck~~ <sup>Vehicles</sup> according to claim 1 further comprising: *PL* *11/13/03*  
a catalyst selected from a water/gas shift reactor catalyst and  
a steam reformer reactor catalyst disposed between the output of  
said means for generating syngas and the membranes of said  
palladium membrane separator, whereby said amount of syngas is  
provided partly by said means for generating syngas and partly by  
said catalyst. *11/13/03*

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4. A ~~truck~~ <sup>Vehicle</sup> according to claim 1, further comprising: *PL* *11/13/03*  
means for diverting syngas from said main output of said  
separator, that is not utilized to regenerate the NOx trap catalyst,  
either (a) to the engine or (b) to a burner-driven air conditioning  
system. *11/13/03*

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